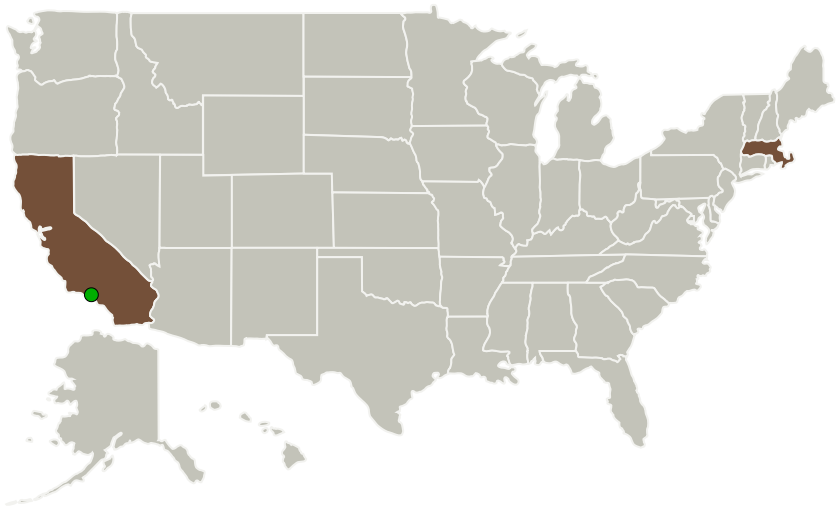
Portable Sensor for Rapid In Situ Measurement of Trace Toxic Metals in Water, Phase I

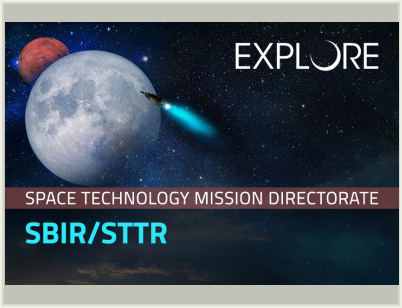
Completed Technology Project (2011 - 2011)

Project Introduction

Water is one of the most crucial provisions that astronauts need to live and work in space, whether orbiting Earth, working at a lunar base or traveling to Mars. For long-duration human missions, drinking water can come from a variety of sources including treated humidity condensate, urine, hygiene water or makeup sources (e.g., water brought up from the ground or obtained through fuel cells). There are concerns that reclaimed water may contain trace toxic metals and/or the recovery and treatment processes may result in corrosion and leaching of metals during storage (methods for spacecraft guidelines). As a result, these systems must be continually monitored to ensure the health of the crew. The overall objective of the proposed program is to develop a field compatible electrochemical sensor for the identification and measurement of trace heavy metals in the water. Phase I will investigate the optimal design configuration, electrode configuration, and operating conditions, which will enhance sensitivity and enable reproducible detection of the dissolved compounds such as cadmium, nickel, silver and zinc in water. The proposed process can be carried out rapidly without the use of dangerous chemicals and will fulfill NASA's need.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
Giner, Inc.	Lead Organization	Industry	Newton, Massachusetts
Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations	
California	Massachusetts

Project Transitions

February 2011: Project Start

September 2011: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140227)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Giner, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Badawi M Dweik

Co-Investigator:

Badawi Dweik

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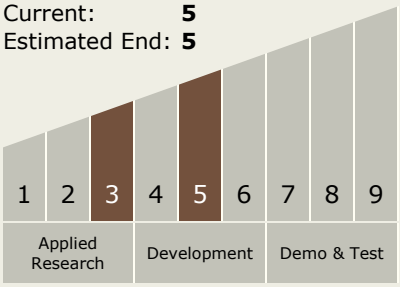
Technology Maturity (TRL)

Start: **3**
Current: **5**
Estimated End: **5**



Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.4 Environmental Monitoring, Safety, and Emergency Response
    - TX06.4.1 Sensors: Air, Water, Microbial, and Acoustic

Target Destinations

Earth, The Moon, Others Inside the Solar System, Outside the Solar System, The Sun, Mars